cal laboratory, each student has his own place, with full set of apparatus and reagents. The laboratory is open from 11 a.m. to 5 p.m. In Botany, Prof. E. Perceval Wright gives the first ten lectures to the class in the lecture-room, on the general details of the structure and morphology of flowering-plants. The second part of the course consists of ten demonstrations on such forms as Bacteria, Yeast-mucor, Saprolegnia, Oïdium, Mushroom, the Algæ; and the remaining portion is given in the College Botanical Gardens, when each student is required to have a practical acquaintance with a certain number of natural families. The demonstrations in Comparative Anatomy are conducted by Prof. Macalister, F.R.S., who is fortunate in having the resources of the gardens of the Zoological Society to assist in the practical work of his class. So far as the experiment has this session gone, the results have been most happy, the students showing a far greater interest in their work, and the demonstrations being less formal than the lectures, they have greater facilities for asking questions.

THE fiftieth anniversary of the foundation of the Technische Hochschule at Hanover is being celebrated during this week. Numerous guests from all parts of Germany, as well as from England, Sweden, Norway, the Netherlands, and Russia have arrived at Hanover.

SCIENTIFIC SERIALS

Journal of the Academy of Natural Sciences of Philadelphia, vol. 7, second series, part 4, 1874-1881.—Wm. M. Gabb, descriptions of Caribbean Miocene fossils; descriptions of new species of fossils from the Pliocene clay-beds between Limon and Moen, Costa Rica, together with notes on previously known species from there and elsewhere in the Caribbean area (with four plates).—Andrew Garrett, on the terrestrial mollusca inhabiting the Cook's or Harvey Islands.—Dr. C. Chapman, the placenta and generative apparatus of the elephant (with three plates).—Dr. Joseph Leidy, on some parasites of the Termites (gives full descriptions, with figures, of the strange forms briefly described in the *Proceedings* of the Academy of Natural Sciences, Philadelphia, for 1877. *Trichonympha agilis* is a truly extraordinary form, possibly a protozoan intermediate between the Gregarines and Infusoria).—Dr. Joseph Leidy, remarks on *Bathygnathus borealis*.

Zeitschrift für wissenschaftliche Zoologie, Bd. 35, Heft 3, 1881.—Dr. J. W. Spengel, the organ of smell and nervous system in the mollusca, a contribution to our knowledge of the unity of the molluscan plan (plates 17, 19).—Dr. O. Bütschli.—Short contributions to a knowledge of the Gregarines: (1) on the development of *Gregarina* (*Clepsidrina*) *blattarum*; (2) on the power of adhering in *Monocystis magna*, and on the pseudonavicella in the monocysts of the earth-worm; (3) on some egg-shaped Psorospermia in the intestine of *Lithobius forficatus* (plates 20, 21).—Prof. F. E. Schulze, researches on the structure and development of sponges, x. On *Corticium candelabrum*, Schdt. (plate 22).—Dr. A. Gruber, on the process of division in *Euglypha alveolata* (plate 23).—B. Ulianin, on the development in amphipods (plate 24).—Dr. Paul Fraisse, on molluscan eyes with an embryonal type (plates 25 and 26) (Patella, Haliotis, Fissurella).—Dr. P. A. Loos, on the albuminiferous glands in amphibia and birds (plate 27).

Atti della R. Accademia delle Scienze Fisiche e Matematiche, Napoli, vol. vii.—F. Panceri, the phosphorescence and the phosphorescent organs in some Annellida (Chætopterus, Balanoglossus, Polynoe), plates 1 to 4.—On the seat of the phosphorescence in some Campanularia (with a plate), and observations of some new species of marine nematoid worms (*Desmoscolex elongatus* and *D. lanuginosus*, *Echinoderes meridionalis*, *E. minutus*, *E. eruca*, and *E. spinosus*, *Tristicochæta inarimense*, n.gen. et n.sp. near Chætosoma); all the new species are figured.—A. Costa, notes of a visit to Egypt, Palestine, and the coasts of Turkey (zoological).—V. Cesati, on a new species of Battarræa (*B. Guicciardiniana*), with a plate.—On a collection of Pterydophytes made at Borneo by Signor D. Beccari, with 4 plates.—G. Licopoli, on the fruit of the vine and its chief constituents, with a plate.—G. A. Pasquale, on a new species of Lonicera (*L. stabiana*), with a plate.—F. Gasco, account of the whale (*Balæna Biscayensis*, Esch.) captured at Taranto on February 9, 1877, with 9 plates.—G. Battaglini, on projective geometry.—E. Fergola, on the dimensions of the earth.—G. Nicolucci, the Còla grotto near Petrella di Cappadocia, in the province of Abruzzi, with three plates of animal remains.—On prehistoric researches about the environs of the Lake of Lesina.—L. Palmieri, on the present condition of electrical meteorology.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 12.—"Investigations on the spectrum of magnesium," by Professors Liveing and Dewar.

The flame of magnesium burning in air shows strongly, generally well reversed, the line at wave-length 2850 (Cornu); a strong triplet, resembling in the relative distance of its lines the other magnesium triplets, close to the solar line M; the well-known triplet near L; and a remarkable series of lines and bands, generally resembling the spectra of some compounds, extending from M to between L and K. Neither the strong triplet at M nor this series of bands are represented in the spectrum of magnesium either in the arc or spark. These flame-lines are remarkable as further evidence of the power of substances to emit, at comparatively low temperatures, radiations of short wave-length.

In the arc the authors notice a series of triplets, of which the least refrangible lines have wave-lengths about 2767, 2736, 2798, 2673, 2649, 2633 respectively. These, with the well-known triplets *b*, and those near the solar lines L, P, and S, form a series, similar to those described by the authors in the spectra of sodium, potassium, and lithium, in which the alternate members are sharp and diffuse, and succeed one another at shorter and shorter intervals in a way which indicates that they follow a definite law and are probably harmonically related, though not forming a simple harmonic series. They observe that the line w.l. 2850 is the strongest line of magnesium both in the flame and arc, and one of the strongest in the spark, and that it is nearly the octave of the line some time since observed by them at wave-length about 5710. They observe in the arc only the strongest two of the quadruple group described by Cornu from the spark at wave-lengths 2801, 2795, but they notice both in arc and spark a group of five lines a little higher at wave-lengths about 2782, 2781, 2779, 2778, 2777. All these lines, including the diffuse members of the series of triplets, they have often observed reversed when the arc is taken in one of their crucibles. The line w.l. about 4570, so conspicuous in the flame, first noticed by the authors in the spark, is well seen and easily reversed in the arc, and they believe it to be represented in the solar spectrum by the line w.l. 4570·9 in Ångström's map. Besides these lines they observe in the arc a pair of lines slightly less refrangible than the pair in the spark, described by Cornu near the solar line U. In the spark they observe two pairs of ghost-like lines below the triplet near L, which together with the fainter two of the quadruple group (2801, &c.), seem to suggest the possibility that some of the particles of magnesium have, owing to particular circumstances, their tones a little flattened in regard to these particular vibrations, though the constancy in the amount of displacement of the lines militates against such an hypothesis.

In regard to the *b* group, observations on the spectrum of the fourth order given by a Rutherford grating of 17296 lines to the inch showed that the iron line in b_4 is a little less refrangible than the magnesium line. The additional lines near this group observed by Fievez they ascribe to a periodic inequality in the ruling of the Rutherford grating, arising from an imperfection of the screw of the ruling machine, which produces a series of *ghosts* on either side of each principal line. The positions of these *ghosts* have been investigated mathematically by Peirce (*Math. Journal* of John Hopkins University), and observations of them tally with the theory. They are embarrassing in the case of bright lines, but may be detected by their changes of position in the spectra of different orders.

The magnesium-hydrogen spectrum which the authors have previously investigated and found to be produced at ordinary and reduced pressures when both elements are present, but not otherwise, they have now investigated further by observing the spark discharge between magnesium poles in hydrogen, nitrogen, and carbonic oxide, at pressures varying from one to twenty atmospheres. They find that in hydrogen, when no Leyden jar is used, the peculiar fluted spectrum of magnesium hydrogen is much more brilliant at higher pressures, becoming fully equal in brightness to the *b* group, notwithstanding the increase in brilliance of that group by the higher temperature of the discharge in the denser gas, while the other lines of magnesium fade, and even the hydrogen lines C and F are invisible. This disappearance of the hydrogen lines they ascribe to the large quantity of magnesium carried over in the spark. When a Leyden jar is now connected with the coil the fluted spectrum continues bright for some time, but gradually fades as the continuance of the high temperature sparks decomposes the compound. In nitrogen the flutings are only seen at first, probably from hydrogen occluded, as is usually the case, in the magnesium, and disappear when the pressure is increased, and cannot be made to re-appear either by reducing the pressure or varying the discharge. In carbonic oxide the behaviour is similar. The authors conclude that the production of this spectrum is dependent on a combination of the two elements, and is not merely a matter of temperature. They describe this spectrum as consisting of three parts, a group of three sets of flutings in the yellow commencing at about the wave-lengths 5618, 5566, 5513; a group of two sets of flutings in the green commencing at about w.l. 5210, and close to *b*; and a group of two blue bands with their less refrangible edges at about w.l. 4849 and 4803 respectively. The authors differ from Ciamician, who has figured this spectrum, in regard to the number of flutings in the green and blue. This spectrum can be well seen when sparks are taken from a solution of magnesium chloride in a tube full of hydrogen.

After simplifying the spectrum of magnesium by separating that of magnesium hydrogen, and supposing the triplets to be harmonically related, and perhaps some of the single lines similarly related, there are still a greater variety of vibrations than any very simply constituted particle could be expected to be capable of assuming.

Linnean Society—Anniversary Meeting, May 24.—Prof Allman, LL.D., F.R.S., president, in the chair.—There was a very numerous attendance of the Fellows.—The Treasurer (Mr. Frederick Currey) read his Annual Report, stating that financially the Society continued prosperous. The invested capital at the present date is 3868*l.* 4*s.* 6*d.*, the sum of 140*l.* derived from Fellows' life compositions during the past twelvemonth having been invested in consols. The balance at the bankers at the end of the financial year (April 30) was 532*l.* 10*d.*, and at the bankers' and on hand at this date (May 24) 604*l.* 15*s.* 10*d.* The annual contributions amounted to 928*l.* 4*s.*, and sales of publications 230*l.* 19*s.* 7*d.*; there was an increase in the admission fees, and decrease in compositions. 104*l.* 8*s.* 3*d.* had been expended on the purchase of books for the library, and 48*l.* 1*s.* 11*d.* towards bookbinding and stationery; 765*l.* 18*s.* 2*d.* had been spent on the Society's publications. A handsome donation of 50*l.* had been made by Mr. G. Bentham.—The Secretary (Mr. B. Daydon Jackson) then read his Report. Since the last anniversary eleven Fellows of the Society had died and four had withdrawn. Against this thirty-seven new Fellows had been elected, besides one Foreign Member and one Associate. During the past year there had been received as donations to the library 106 volumes and 125 pamphlets and separate impressions of memoirs; from the various scientific Societies there had also been received in exchange ninety-six volumes and 248 detached parts of publications, besides twenty-three volumes of donations from the editors of independent periodicals. There had been purchased 90 volumes of importance, among these 63 serials, equal to 10 volumes, the total additions to the library therefore being 315 volumes and 373 separate parts. Mr. Kippist had presented framed water-colour sketches of Dr. Robert Brown's birthplace, London residence, and Sir J. Banks's library. The Society's collections and herbaria had been duly examined and reported on to the Council as in good condition. After a service of fifty years Mr. Kippist had resigned his position as librarian to the Society, and the Council, in acknowledgment thereof had granted him a retiring pension.—Mr. Baker, in the name of Mr. J. W. Miers, then presented to the Society a portrait of his father, the late John Miers, as a memento of his connection therewith, and Prof. Allen Thomson as representative of a small committee also presented the portrait of Prof. St. George Mivart, late Zoological Secretary, to the Society.—Prof. Allman then delivered his anniversary address, the subject chosen being "Recent Advances in our Knowledge of the Development of Ctenophora."—The Secretary afterwards read obituary notices of the several Fellows that had died during the year, making special mention of the life and labours of Mr. G. R. Alston, the late lamented Zoological Secretary, Mr. John Gould, the ornithologist, Mr. Gerard Krefft, of Sydney, Dr. J. Lauder Lindsay, and Mr. R. A. Pryor, of Herts.—The scrutineers having examined the ballot, then reported that Mr. Alfred W. Bennett, Mr. Francis Darwin, Prof. E. R. Lankester, Sir John Lubbock, and Mr. Geo. J. Romanes had been elected into the Council in the room of E. R. Alston (deceased), Dr. T. Boycott, Prof. M. Foster, Dr. J. Gwyn Jeffreys, and Prof. St. George J. Mivart, who retired; and for officers Sir John Lubbock was elected president, Mr. F. Currey, re-elected Treasurer, Mr. B. Daydon Jackson, re-elected Botanical Secretary, and Mr. G. J. Romanes was elected Zoological Secretary.

Zoological Society, May 17.—Dr. A. Günther, F.R.S., vice-president, in the chair.—Mr. Sclater exhibited and made remarks on examples of four parrots of the genus *Chrysotis* from various islands of the Lesser Antilles.—A communication was read from Mr. Carl Bock, in which he gave an account of the land- and fresh-water shells collected in the highlands of Padang, Sumatra, and in the eastern and southern parts of Borneo during his travels in those districts. Eight new species were described.—A communication was read from Mr. G. B. Sowerby, jun., containing descriptions of eight new species of shells from various localities.—Mr. W. A. Forbes read a paper on the anatomy and systematic position of the Jacanas (*Parridæ*), which he showed were in no degree related to the rails, but form a separate group, to be placed amongst the plovers and allied birds (*Limicolæ*). The author also called attention to the peculiar form of the radius in the genus *Metopidius*, which is not developed in the other genera of this group.—A communication was read from Mr. L. Taczanowski, C.M.Z.S., containing the description of a new species of weasel from Peru, proposed to be called *Mustela Jelskii*, after its discoverer.—A communication was read from Mr. W. F. Kirby, containing a description of the hymenopterous insects collected in Socotra by Prof. Bayley Balfour. Of these two were apparently new to science.—A communication was read from Mr. Francis Day, F.Z.S., containing remarks on the range of *Apogon Ellioti*.

Royal Microscopical Society, May 11.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—Ten new Fellows were elected and nominated.—Amongst the objects exhibited were Seibert's polarising microscope, Nachet's binocular dissecting microscope, Verick's skin microscope, Houston's botanical microscope, embryological sections from the Naples Zoological Station, &c.—Papers and notes were read on a new and remarkable annelid (Mr. Stewart); the markings of diatoms (Dr. Matthews, Mr. J. Deby and Count Castracane); a new species of *Hydrosera Wallich* (Dr. Stolterforth); and improvements in illumination (Mr. J. Smith); also a note by Prof. Abbe on the conditions of micro-stereoscopic vision, with special reference to the fact that the lineal amplification of an object in depth is equal to the square of the lineal amplification in breadth, reduced, however, in proportion to the refractive index of the medium in which the object is: thus an object under a power of 100 times would be magnified 10,000 times (lineal) in depth if in air, 7500 times if in water, and 6600 if in oil or balsam.

EDINBURGH

Royal Society, April 4.—Prof. Fleeming Jenkin, vice-president, in the chair.—In the absence of the author, Prof. Alleyne Nicholson read a descriptive note by Dr. Carmichael McIntosh on the Phoronis, one of the specimens obtained in the dredging operations of the *Challenger*. This *Annelid* was of special interest as indicating in several particulars close similarity to certain well-known *Cœlenterates*.—Dr. R. H. Traquair read a paper on additional researches on the structure of the *Palæoniscidæ* and *Platysomidæ*. The more that the fossil remains of these families were studied the more difficult did it become to clearly differentiate them from each other; and from his later researches Dr. Traquair had been obliged to adopt a wider definition of *Palæoniscidæ* than he had formerly employed. Hence it appeared that the criticism that had been urged against his former papers, viz., that he had not shown sufficient ground for their separation as two distinct families, could still be urged with even greater reason; but this, according to the doctrine of descent, was a natural consequence of increased information Certain of the specimens he had examined, though retaining the most essential characteristics of either family, as the case might be, possessed modifications of structure which were ordinarily typical of the other. The evidence was that the

Platysomidæ had been derived from the *Palæoniscidæ*.—Prof. Tait communicated a number of results of experiments on the heating effects of compression—experiments that had been suggested by his recent inquiry into the pressure errors of the *Challenger* thermometers. Specimens of various substances, such as raw potato, raw flesh, cheese, pith, bar-soap, liquorice, cork, india-rubber, &c., were compressed suddenly in a hydraulic press. The rise of temperature was measured by means of a thermoelectric junction set into the heart of the material, and connected to a delicate galvanometer in a contiguous room. After the heat evolved by the compression had diffused itself, so that the galvanometer came back nearly to its old zero, the pressure was suddenly relieved, and the heat absorbed in the return of the substance to its original bulk was measured by the reverse current produced. In most cases this cooling effect was exactly equal to the original heating effect. Cork however, which rose in temperature 1°·3 F. for one ton's weight increase of pressure, fell in temperature only 0°·9 F. on removal of the pressure—a result in striking accordance with the well-known sluggishness of cork in recovering its original bulk after withdrawal of the pressure that had compressed it. In this particular, india-rubber, whose temperature was raised about 1°·5 F. for the same increase of pressure, was markedly opposed to cork. Potato and raw flesh both indicated about the same rise of temperature—0°·7 F. Pith, again, which resembles these in the large percentage of water that enters into its constitution, was raised in temperature only 0°·37 F., giving no perceptible difference of effect over what would have been produced by water alone.

PARIS

Academy of Sciences, May 23.—M. Wurtz in the chair.—The following papers were read:—On the old Observatory of Cairo, by M. de Lesseps. This observatory no longer exists; but M. de Lesseps, in a letter here given, urges its restoration on the Khedive. It is stated that the Egyptian Institute in Cairo has received the *Connaissance des Temps* complete from 1679 to 1866.—Nebulæ discovered and observed at the Obsernatory of Marseilles, by M. Stephan.—On the genera *Williamsonia* Carruth., and *Goniolina* d'Orb, by MM. de Saporta and Marion.—On an experimental process for determining the sensibility of the retina to coloured luminous impressions, by M. de Grandimont. The observer looks steadily at the central point of a disk having apertures, beyond which coloured surfaces are placed. By degrees the sensation of colour is extinguished. On suddenly putting white surfaces in place of the coloured, the complementary colours come out with great brightness and purity. The instrument is named a *chromatroposcope*.—Barometer based on the equivalence of heat and pressure on the volume of a gas, by M. Decharme. It consists simply of an ordinary alcohol or mercury thermometer, and an air thermometer to show the volumes of gas corresponding to the temperatures observed. To find the atmospheric pressure, the data of these instruments are interpreted by the aid of curves and tables previously prepared.—On a cryptogam insecticide, by M. Lichtenstein. This is a *Botrytis* (same genus as that which infests the silkworm), found to have killed all the aphidians on a cineraria in the Jardin des Plantes at Montpellier. It operates only in the hothouse, and M. Lichtenstein could not inoculate either phylloxera or other plant-lice with it in open air.—On the geometry of spheres, by M. Stephanos.—On Fuchsian functions, by M. Poincaré.—The standards of weights and measures at Paris Observatory and the apparatus used in their construction; their origin, history, and present state, by M. Wolf. This note relates chiefly to the toise du Perou and du Nord (so called), which the author considers to be now in the same state as when they came from the hands of Langlois in 1735.—On the law of radiation, by M. Violle. This law may be represented between 0° and 1775° by the formula $I = mTb^{T^2}a^T$, where T represents the absolute temperature, m a constant coefficient, b the number 0·9999938, $a = 1·03550 - 13\lambda$, λ being the wave-length in millimetres.—On the production of sound by the force of radiation, by Prof. Ball.—On radiophony; thermophone reproducing the voice, by M. Mercadier. Light is reflected from a plate of silvered glass, behind which is a small air reservoir, with a thin plate of mica or caoutchouc, which receives the voice through a tube. At the receiving-end, one of the author's small glass tubes, with as moked piece of mica and ear-tube, is brought where the light is concentrated by a lens or concave mirror. With this arrangement speaking was distinctly, though faintly, heard at about 20m. distance, the windows of the speaker's room being closed.—On the same subject, by the same. A long tube (10m.) may be used by the speaker. Electric light and (less easily) oxyhydrogen light, gave the effects. Solar radiations act best when hottest. Alum solution interposed reduced the effects considerably; with a thin ebonite plate they were weakened, but still distinct; similarly with plates of tinsel of zinc, copper, aluminium, &c., $\frac{1}{10}$mm. to $\frac{1}{20}$mm. thick.—Modification of the Neef interrupter for the Ruhmkorff coil, by M. Ducrétet. The vibrating slip is lengthened and its two ends fixed to two columns; the small soft iron mass in the middle. The vibrations are very rapid; the spark is modified, becoming continuous, more powerful, and hotter.—On the rotatory power of artificial codéine, by M. Grimaux.—On the proportion of carbonic acid contained in the air, by MM. Muntz and Aubin. This gives results of observation, by a method formerly described, at Paris and a station in the country. They appear mainly to confirm M. Boussingault's and M. Reiset's results. The proportions of CO_2 in normal air vary within but narrow limits. In the environs of Paris, whatever the direction of the wind, figures were got closely similar to those of M. Reiset near Dieppe.—Preliminary study of reactions without the intervention of a solvent, by M. Lorin.—On silicomolybdates, by M. Parmentier.—Action of ammonia on chloride of isobutylene, by M. Oeconomidés.—On some points relative to the organisation and the development of Ascidians, by M. Van Beneden. This relates to his observations at the Naples station in April last. The development of Ascidians does not (he considers) warrant the radical distinction drawn by the brothers Hartwig between a mesoderm and a mesenchyme.—The vessels of the ink-bag of cephalopoda, by M. Girod.—On the troubles of sensation produced by cortical lesions of the brain, by M Couty. The observations were upon apes and dogs. Anæsthesia, when it occurs, affects the side opposite that of the cortical lesion, and for touch, as for vision, is always incomplete. It is rare, and it has no relation to the place or extent of the cortical lesion. These troubles of sensibility have no necessary connection with other troubles.—Mechanism of infection in different methods of inoculation of symptomatic *charbon*; application to the interpretation of clinical facts and to the method of preventive inoculations, by MM. Arloing, Cornevin, and Thomas. An abortive *charbon* may be given by inoculation in the veins, in the connective tissue, or in the respiratory passages.—M. Richard announced the discovery of a cavern in the mountain of Ayuso (Segovia), containing a large number of prehistoric *débris*.

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